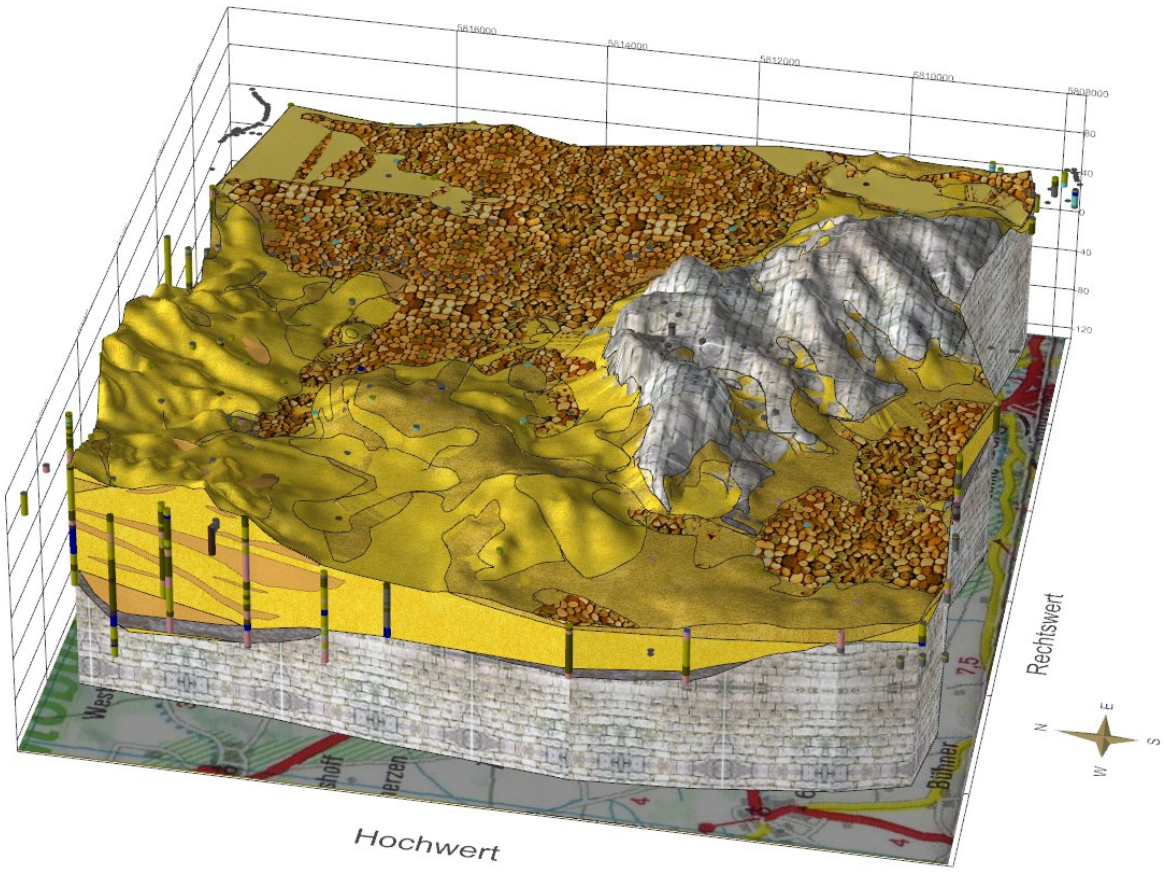
SubsurfaceViewer

Quick-Start Guide



Using SubsurfaceViewer

The SubsurfaceViewer allows flexible and comprehensive 2D- and 3D-presentations of subsurface models on the computer screen. The software allows potentially anyone to view and further analyse these models at their workstations with the SubsurfaceViewer version that can be downloaded free of charge from the INSIGHT Web site at http://subsurfaceviewer.com/.

In contrast to conventional software tools for graphic representation and analysis of subsurface data, the SubsurfaceViewer can read and handle most kinds of different data formats to form and create 2D- and 3D-graphics that contain all information of the subsurface and of the entire digital subsurface model. Because the user retains unlimited access to the model data, he is free to adapt the chart presentation to any upcoming question arising in the process of discussing the subsurface of an area.

The SubsurfaceViewer allows the provider of digital underground models to publish and distribute, even on the internet , unlimited copies of any such model and data sets to a potentially unlimited number of users. The user benefits from the free download version of the SubsurfaceViewer that location-independently allows presentation and further analysis of digital subsurface models.

How to get started

This quick start guide describes in short how to handle the functionality of the SubsurfaceViewer. After reading it, you should be sufficiently informed about how to get an insight in the geologic and hydrologic structure of the subsurface with this tool.

The SubsurfaceViewer is a program for the visualisation of geologic data and digital subsurface models. To download the SubsufaceViewer program go to www.SubsurfaceViewer.com and download the 32- or the 64-bit version of the program, depending on your operating system.

System Requirements

- Windows XP, Windows Vista, Windows 7, Windows 8
- Open GL (at least.) v. 2.1.
- 1 GB memory

Installing the SubsurfaceViewer

In order to start the installation of the SubsurfaceViewer after the download, double-click on the SubsurfaceViewer set-up-program to execute this file. A dialog windows appear on the screen and prompts you to

- accept the licence agreement. Then click **Next**.
- accept or change installation path. Then click **Next**.
- accept or refuse desktop icon. Then click **Next**.
- your selections are displayed. Then click **Install**.
- **Start** the installation immediately or choose **Do not start**.
- click **Exit**.

Shortly, the installation program will unpack all necessary files and install the SubsurfaceViewer program. You will find the SubsurfaceViewer in the program list of your operating system. The start-up icon of the program is displayed on your desktop (if accepted in the set-up).

Start the SubsurfaceViewer

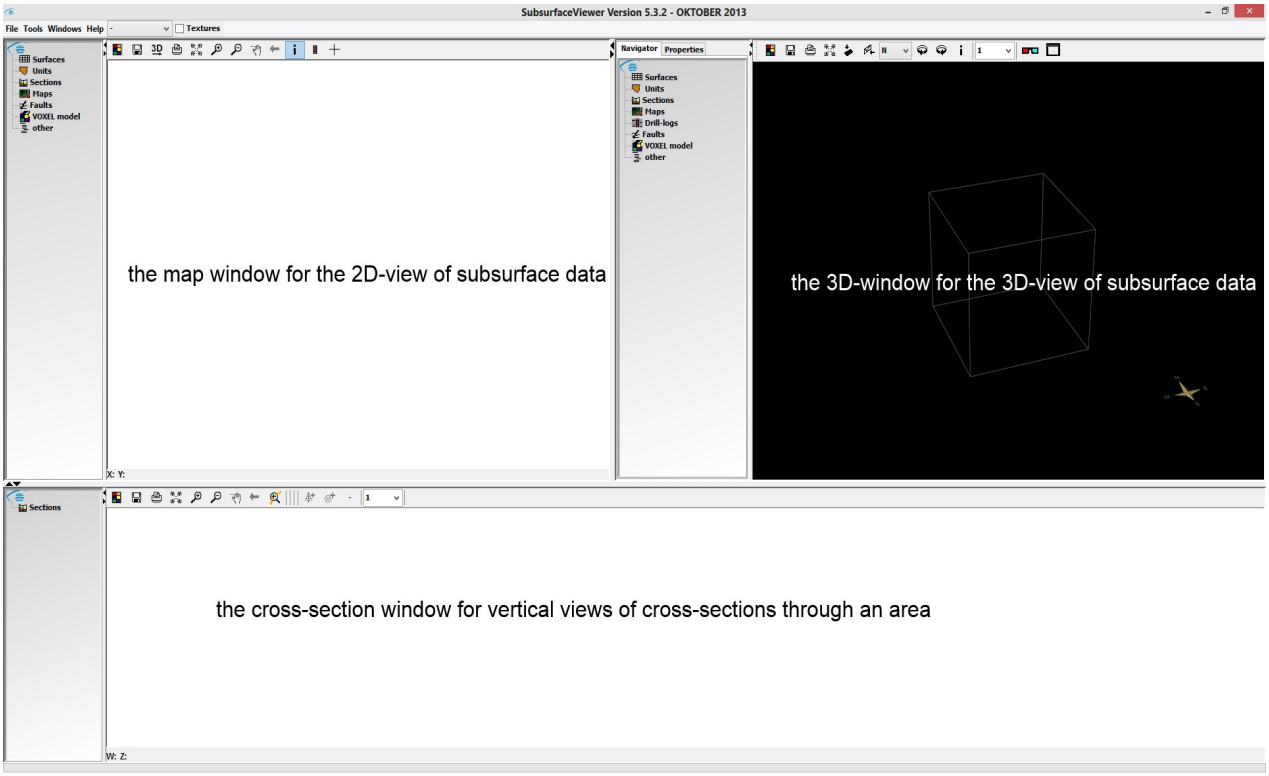
Double-click on the SubsurfaceViewer icon on your desktop or select it from the program list. Some seconds after the splash screen, the initial screen of the Viewer is displayed. It consists of three frames.

At the top you can see a menu bar where you find the ***File***, ***Tools***, ***Windows*** and ***Help*** menu plus an option to select the type of model. There is another option to turn ***Textures*** on or off, so you can load projects, adapt settings, make vertical and horizontal cross-sections and have additional windows displayed.

On starting the Viewer, the standard screen is displayed. It consists of three frames:

- top left: the **map window** for the 2D-view of subsurface data.
- top right: the **3D-window** for the 3D-view of subsurface data .
- below: the **cross-section window** for vertical views of cross-sections through an area.

Each of these three frames is divided into two parts:
The left side of each frame shows the so called **object list**. This is a list of object types that work like ´folders ´ where you can choose the geological objects - for example the surfaces, units, cross-sections, maps and faults you would like to be added to or deleted from your respective current chart. Any of these objects can always be switched visible or invisible, to the effect that the chart of the subsurface model is constantly adaptable to the requests of the moment.



Right-click on each object to set the properties for the respective representation in the 2D- and 3D- window. Along with the object list in the 3D-window ***(Navigator)*** you can use ***Properties*** to select details and modes of the 3D-chart, like **Exploded View**, **Video** and others.

If you want to enlarge frames, press the mouse button on a frame divider, move it and cover the frame below. Alternatively you can use the small arrows on the top of the frame divider to automatically hide the window in the direction of the arrow. The object list and the chart of each window can also be re-sized this way.

The 3D-frame can be detached from the standard screen to be displayed separately, in order to have a full screen representation or if you like to show it on a second monitor or if want to use a beamer. Click ***Detach 3D View*** in the *Windows* menu to use this option.

At the top of each window there is a toolbar with several elements to enable the user to control the charts.

Loading a project file

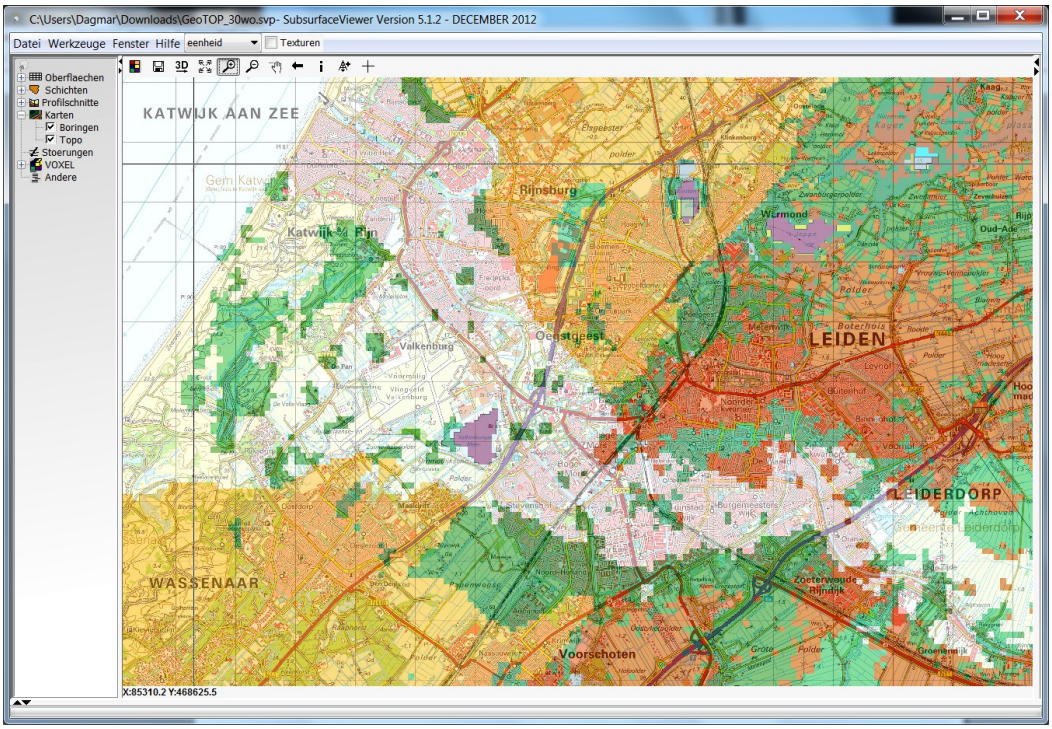
Click ***File - Open Project*** to load a project file (*.svp).

The Map Window

A project normally consists of a huge number of objects, each of which is identified by a unique name. You can find them in the object list. These objects are always linked to the map window where they are subordinated to the respective object type.

Object types:

-	Surfaces	These are surfaces in real-space, i.e. natural ground surfaces or a groundwater surfaces.
-	Units	This “folder” contains all geologic units, normally sorted from top to bottom.
-	Sections	Here you find the vertical cross-sections.
-	Maps	This object type folder contains the map objects, like for example topographical maps, drill-log maps and horizontal sections.
-	Faults	Geological faults.
-	VOXEL	3D-grids of the subsurface of different properties.
-	other	other objects are not used in this version of the SubsurfaceViewer.



You can display a list of the objects of each object type by clicking on the respective object type name. You can decide which objects are to be displayed by left-clicking on the tag field next to the respective object. By right-clicking on an object name you open a popup-window which allows you to control and change the properties of an object. You can also sent objects to the front or to the background or link objects with the 3D-window.

The Cross-Section Window

The cross-section window contains just one object type: cross-sections. They can either already exist in the loaded project or you can create them, if the project contains geological units and/or VOXEL models.

In order to make a cross-section, click ***create new section*** in the *Tools* menu to activate this option. Then, enter a section name in the popup-window and activate the **i (info)** button in the toolbar of the 2D-view. Press the left mouse button on the map to define a coordinate – the first point of the cross-section to be made, represented on the map by a small red triangle.

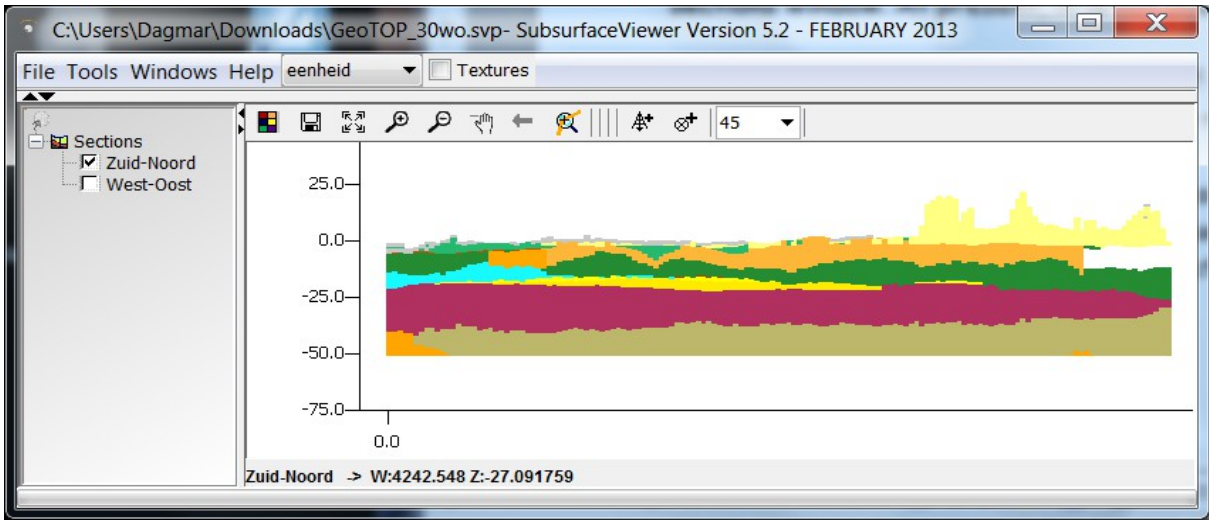
Click the ⊗+ symbol (add point to section) in the section window to link this coordinate to the cross-section. The XY-coordinates are displayed in a popup-window where you can accept or change them if desired. This

point is defined as the first point of the cross-section and every additional point of the section including the last point is created in the same way. From the second point on the section is represented by a chart in the section window. You can see the run of the section in the map window, represented by a red line.

An active section is one where you can add more points and which is always represented by a red line. A black section line in not active but can be re-activated and displayed in the section window. A cross-section is never irrevocably completed. New points can always be added to a section. To do so, choose the respective section via the object list of the section window.

You can define the vertical exaggeration of a cross-section by selecting or by entering a number in the selection box on the very right of the toolbar of the section window.

Properties for the layout of each section can be set in the popup-window that is displayed if you right-click on the respective name of a section in the object-list. The properties can also be defined globally for all cross-sections by choosing the object type *Sections* instead.



It is also possible to generate a cross-section by using drill-log coordinates. In this case, choose the symbol (add borehole to section). Condition precedent is that there is a drill-log map displayed in the map window that contains the boreholes which are represented by small coordinates symbols on the map. They are selected via the **i (info)** button in the toolbar, in the same way as you select the points of coordinates. It is also possible to use both coordinates of points and borehole coordinates for the same cross-section in any order. The boreholes selected will be represented at the correct position of the cross-section.

The position of the cursor in the section window equals the one in the map window, where it is represented by a cross-line.

The 3D-window

Every object of a project can be visualized in the 3D-window. To do so, you either link all objects of an object type to the 3D representation – click on the object type name in the map window, press the right mouse button and choose the option *Link all objects to the 3D window* – or select and link every object separately. Just map objects that only exist as images cannot be linked directly to the 3D view but the whole visible map in the map window can be transferred to the 3D-window by clicking the 3D symbol. To do so, you have to assign an elevation value to the map in the map window. A window pops up when you click the 3D symbol, where you can insert an elevation value or choose a surface from the project for elevation reference. The grade of elevation can be entered in the toolbar like you do in the sections window.

You can control the chart in the 3D-window with the mouse:

-	Turn and rotate:	Keep left mouse button pressed and move chart.
-	Zoom:	Keep the right mouse button pressed or use the scroll wheel of the mouse.
-	Move 3D-model within the window	Keep the right and the left mouse button pressed simultaneously. If your mouse does not have two buttons, press the shift key and the mouse button simultaneously.

There are more options to control the 3D-view in the toolbar of the 3D-window:


Background Colour


Save 3D-window as image


Full screen

Map view (from above)

Side view

A selection box to define the direction, from where to look onto the 3D-graph (E (East), N (North), NW (North West) etc., + T (Top = from above), B (Bottom = from below).


Rotate right


Rotate left

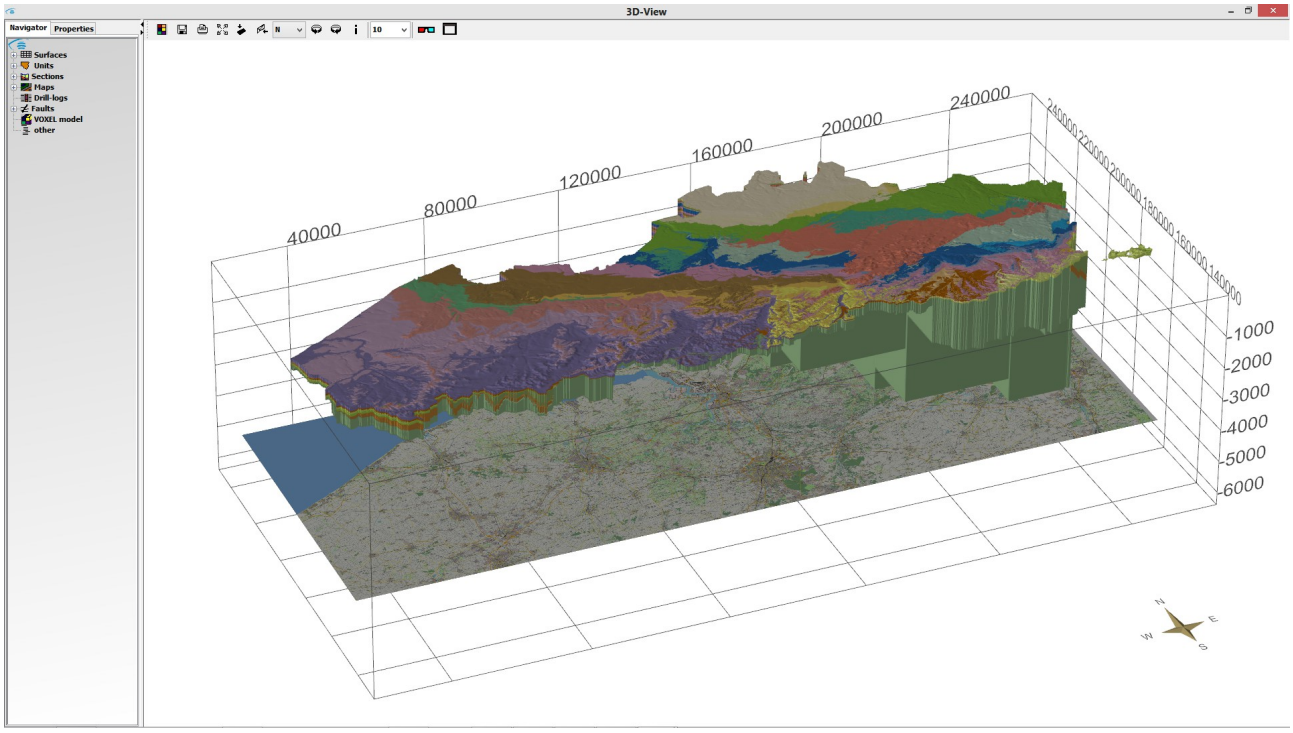
info of current step of procedure


set anaglyphs on/off


show 3D view full screen (2 screens)

And, there is the option in the toolbar where you can choose or put in a number to define the grade of elevation.

In this window, as different to the others, there is another flag next to the one named *Navigator (* the object list). It is called *Properties* and contains a window with more options to control the 3D-view:



- General Here, you can switch on/off the background image, set the cross-line, show a multiple quadruple view of the models and define stereo-properties.
- Scale Define the scale frame, the label axis and axis division and the color of the scale, set the light angle to light your chart model and switch on/off the compass rose.
- Exploded Activation and controlling of the exploded view of the 3D-subsurface-model chart.
- Video Allows the user to make the 3D-chart rotate and save the rotation as a video-file. You can also control the speed of rotation.
- Font In this window you can select the font type, font color, font size and the font depth of the scale labels and you can assige an axis title to each axis (Label X / Label Y-axis).

The JAVA-Console

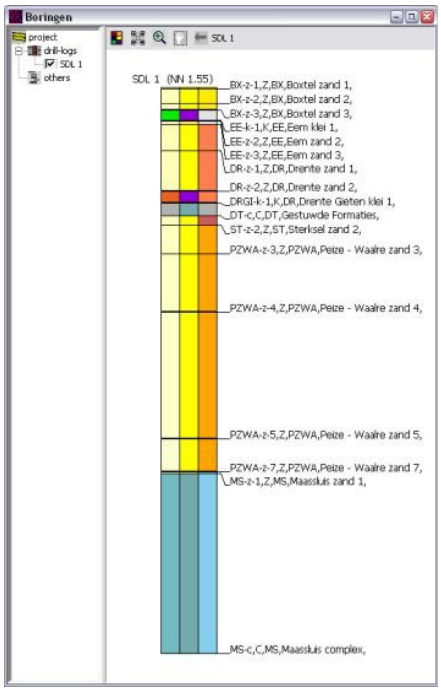
To open the JAVA-Console window select *Java Console* in the *Windows* menu of the toolbar. Here is where you can find information of the application in writing, for example, which objects are being loaded as well as the information from the 3D-window prompted when the symbol i was selected in the 3D-window, error-messages, etc.

The horizontal slice

You can make horizontal slices: Select *Create horizontal slice* in the *Tools* menu, insert a number to reference the elevation, and the corresponding horizontal slice through your digital model is calculated and displayed. Such a slice is going to be added as an object to the object type *Maps*. Of course it is also possible to create that link in the usual way via in the 3D-window. Horizontal slices are only possible, if there is a digital subsurface model in the project.

The drill-log window

Two special functions of the chart representation are related to the drill-log window, where individual drills or hypothetical drill-logs on the basis of a subsurface model are represented. If you open this window, you can display either a single drill-log by pressing the i (info) button in the toolbar of the map window and selecting a drill-log or push the borehole symbol to display a hypothetical drill-logs by clicking somewhere inside the map window.



Click on *Properties* to open the drill-log layout setting window to freely select the layout of the chart.

Conclusion

This program application contains many additional options to represent subsurface and model data: change setting of all objects, show top/bottom or side by side stereo pictures, show thickness maps, display raster-chart, change transparency, calculate videos , etc. The contents of this Quick-Start-Guide, however, should be sufficient to enable you to use the SubsurfaceViewer successfully to represent digital subsurface models on the computer screen in the way you want to present them.